

REMARKS

By this Amendment, claims 20 and 22 are amended. Claims 10-19 and 21 remain in the application. Thus, claims 10-22 are active in the application. Reexamination and reconsideration of the application are respectfully requested.

The Applicants thank the Examiner for kindly indicating, on page 6 of the Office Action, that claims 10-11 and 21-22 are allowed. Claim 22 was amended to correctly depend from claim 21 instead of claim 10. The Applicants respectfully submit that claim 22, as amended, is still clearly in condition for allowance.

On page 2 of the Office Action, claims 12, 16, 17 and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kim (U.S. 6,168,879) in view of Saito et al. (5,586,993). This rejection is respectfully traversed for the following reasons.

Claim 12 recites a lid of a secondary battery. The lid of claim 12 comprises a plate-shaped body having a hole formed therein, an insulating member mounted in the hole formed in the body, and a sealing member having a flange portion at one end thereof and inserted in the hole formed in the body. The lid of claim 12 also includes a rivet which comprises a shank and a head. The shank of the rivet of claim 12 has a first end inserted in the sealing member and caulked to join the insulating member and the sealing member to the body, and the shank has a second end opposite from the first end, where the head is provided on the second end of the shank. The lid of claim 12 further comprises a lead wire that is directly connected to the first end of the shank.

Claim 17 also recites a lid of a secondary battery. The lid of claim 17 comprises a plate-shaped body having a hole formed therein, and a sealing member inserted in the hole formed in the body, where the sealing member has a flange portion at one thereof and the sealing member is made of an insulating material. The lid of claim 17 also includes a rivet which comprises a shank and a head. The shank of the rivet of claim 17 has a first end inserted in the sealing member and caulked to join the insulating member and the sealing member to the body, and the shank has a second end opposite from the first end, where the head is provided on the second end

of the shank. The lid of claim 17 further comprises a lead wire that is directly connected to the first end of the shank.

Accordingly, the lids of claims 12 and 17 each recite that the rivet has a first end which is inserted in the sealing member and caulked to join the sealing the member to the body. Further, the lids of claims 12 and 17 also each recite that a lead wire is directly connected to the caulked first end of the rivet.

Kim discloses a cap assembly 6 for a secondary battery which includes a negative plate (body) 10 having a hole formed therein, a positive plate 12 disposed on a center portion of the cap assembly 6, and an insulating plate (sealing member) 14 disposed between the negative plate 10 and the positive plate 12. The cap assembly 6 also includes a rivet 16 that penetrates through the centers of the negative plate 10 and the positive plate 12. The bottom (first) end of the rivet 16 is connected to a tab 8, and the top (second) end of the rivet 16 is bent (see Column 1, lines 35-43 and Figure 3).

As acknowledged by the Examiner, Kim does not disclose or suggest that the bottom (first) end of the rivet 16 is caulked to join the insulating plate (sealing member) 14 to the negative plate (body) 10. Further, since Kim does not disclose or suggest a shank having a first end inserted in the sealing member and caulked to join the sealing member to the body, Kim also does not disclose or suggest a lead wire directly connected to the caulked first end of the shank, as recited in claims 12 and 17.

To overcome the deficiencies of Kim, the Examiner cited Saito et al. as disclosing that the hole of the lid is caulked in order to seal and fix the rivet to the cover plate. Saito et al. discloses a sealing assembly C having a hollow rivet 3. The hollow rivet 3 includes a hollow shaft portion 3b and a head 3a. The hollow shaft portion 3b includes a distal end portion 3c that is caulked by being diametrically enlarged (see Column 5, lines 7-10, Column 6, lines 65-67 and Figure 4).

Similar to Kim, however, Saito et al. also does not disclose or suggest a lead wire directly connected to the caulked first end of the shank, as recited in claims 12 and 17. Instead, Saito et al. discloses that the gasket 6 and the insulating spacer 9 provide for electrical insulation between

the cover plate 2 serving as a negative element and the hollow rivet 3 serving as a positive element. Saito et al. also discloses that the gasket 6 and the insulating spacer 9 provide for electrical insulation between the cover plate 2 serving as a negative element and the lead piece 7 serving as a positive element (see Column 5, lines 50-54). Saito et al. discloses that the lead piece 7 provides an electrical connection between positive terminal 4 and positive plates 1c in an electrical power generator element 1a via positive collectors 1b that are connected to the lead piece 7 and the hollow rivet 3 on which the lead piece 7 is fitted (see Column 6, lines 26-30). Accordingly, Saito et al. discloses an indirect electrical connection between the positive terminal 4 and the outside surface of the hollow shaft 3b of the rivet through the lead piece 7.

Saito et al., therefore, does not cure the deficiencies of Kim for failing to disclose or suggest a shank having a first end inserted in the sealing member and caulked to join the sealing member to the body and a lead wire being directly connected to the caulked first end of the rivet, as recited in claims 12 and 17, because Saito et al. does not disclose or suggest a lead wire being directly connected to caulked first end of the rivet.

However, even though Saito et al. merely discloses a caulked distal end portion 3c of the hollow rivet 3 but does not disclose or suggest a lead wire being directly connected to the caulked first end of the rivet, the Examiner concluded that it would have been obvious to one of ordinary skill in the art at the time the present invention was made to caulk the rivet and the insulating member of Kim to the plate shaped body since caulking the members will allow for a strong, durable seal between the components of the lid in order to prevent interaction between elements of the interior and exterior environments of the battery casing.

Despite the Examiner's assertion to the contrary, the Applicants respectfully submit that it would not have been obvious to combine the teachings of the Kim and Saito et al. to result in the present invention as recited in claims 12 and 17. As described above, the top (second) end of the rivet 16 of Kim is bent. Bending and caulking are similar operations in the art to which the present invention pertains. Accordingly, with or without the disclosure of Saito et al., it would have been obvious to one of ordinary skill in the art to caulk, instead of bend, or to bend and then caulk the top (second) end of the rivet 16 of Kim.

However, the Applicants respectfully submit that it would not have been obvious to caulk the bottom (first) end of the rivet 68, 16 of Kim to result in a first end of the rivet that is caulked to join the sealing member to the body and a lead wire being directly connected to the caulked first end of the rivet, as recited in claims 12 and 17. As is clearly illustrated in Figures 1 and 3 of Kim, the rivet 68 of Figure 1 and the rivet 16 of Figure 3 each has a large, flat bottom (first) end that is directly connected to the tab 74, 18. Since the bottom (first) end of the rivet 68, 16 is already formed with large and flat portion, it would not have been obvious to a person of ordinary skill in the art to substitute the caulked distal end portion 3c of the rivet of Saito et al. for the large, flat bottom (first) end of the rivet 68, 16 of Kim. Similarly, since the bottom (first) end of the rivet 68, 16 is already formed with a large and flat portion, it would not have been obvious to a person of ordinary skill in the art to combine the teachings of Saito et al. to caulk or bend the bottom (first) end of the rivet 68, 16 of Kim so as to result in the rivet of claims 12 and 17.

Moreover, the Applicants respectfully submit that combining Kim and Saito et al. would teach away from an object of the present invention, which is to reduce the number of parts of a lid of a secondary battery in comparison to the conventional lid of a secondary battery. As described in paragraphs [0015] and [0035] of the substitute specification, by directly connecting the lead wire to the caulked first end of the rivet, it is possible to omit a terminal plate, such as the terminal plate 2 shown in Figure 2B of the present invention or the lead piece (terminal plate) 7 of Saito et al. As described above, the tab 74, 18 is disclosed as being directly connected to the non-caulked, flat and large sized bottom (first) end of the rivet 68, 16 (see Column 1, lines 39-42, Column 3, lines 43-46 and Figures 1 and 3). However, the positive plate (terminal plate) 66, 12 of Kim is required for the construction of the cap assembly in order to support the positive terminal 76 since the rivet 68, 16 is inserted from the inside of the cap assembly to the outside of the cap assembly (see Figures 1 and 3). Furthermore, even if the non-caulked, flat and large sized bottom end of the rivet 68, 16 of Kim was replaced with the hollow rivet 3 of Saito et al. having the caulked distal end portion 3c, such a modification of the cap assembly of Kim would still require there to be a terminal member (lead piece 7). Saito et al. specifically discloses that

the material constituting the hollow rivet 3 is not particularly limited “so long as [the hollow rivet] can be fixed to the cover plate together with the gasket 6 and lead piece 7 by caulking the distal end portion 3c”. Therefore, even if the caulked distal end portion 3c of the hollow rivet 3 of Saito et al. were substituted for the non-caulked, large and flat bottom (first) end of the rivet 68, 16 of Kim, a terminal plate would still be required to support the positive terminal 76 of Kim, whereas the present invention, by providing a rivet having a first end that is caulked to join the sealing member to the body and a lead wire that is directly connected to the caulked first end of the rivet, a terminal plate, such as the lead piece 7 of Saito et al. and the positive plate 66, 12 of Kim, can be omitted. Accordingly, the Applicants respectfully submit that combining Kim and Saito et al. would teach away from the inventions of claims 12 and 17.

Therefore, the Applicants respectfully submit that it would not have been obvious to combine Kim and Saito et al. to result in a rivet having a first end that is caulked to join the sealing member and body and a lead wire that is directly connected to the caulked first end of the rivet, as recited in claims 12 and 17. Furthermore, the Applicants respectfully submit that claims 12 and 17 are clearly allowable over Kim and Saito et al. since Kim and Saito et al., either individually or in combination, fail to disclose or suggest each and every limitation of claims 12 and 17.

On page 4 of the Office Action, claims 13-15 (and 16) and 18-19 (and 20) were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kim in view of JP 11167909 (hereinafter “JP ‘909”) and further in view of Saito et al.

As described above, Kim and Saito et al., either individually or in combination, do not disclose or suggest each and every limitation of claims 12 and 17. For the following reasons, the Applicants respectfully submit that JP ‘909 does not cure the deficiencies of Kim and Saito et al. for failing to disclose each and every limitation of claims 12 and 17.

JP ‘909 discloses that a rivet 5 is arranged in the sealing board 2 and that a metal washer 7 is threaded on the rivet 5. JP ‘909 also discloses that the lead board 13 is indirectly connected through the lower insulation gasket 8. Accordingly, JP ‘909 clearly does not disclose or suggest a lead wire that is directly connected to the first (lower) end of the rivet, as recited in claims 12 and 17. Furthermore, JP ‘909 does not disclose or suggest the first end of the rivet 5 being caulked to join a sealing member to the body, as recited in claims 12 and 17.

Therefore, JP '909 clearly does not cure the deficiencies of Kim and Saito et al. for failing to disclose each and every limitation of claims 12 and 17. Accordingly, the Applicants respectfully submit that claims 12 and 17 are clearly allowable over Kim, Saito et al. and JP '909 since Kim, Saito et al. and JP '909, either individually or in combination, fail to disclose each and every limitation of claims 12 and 17.

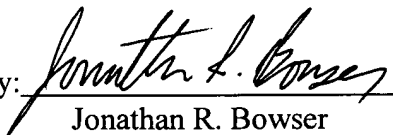
Because of the clear distinctions discussed above, it is submitted that the teachings of the applied references, either individually or in combination, do not meet each and every limitation of claims 12 and 17. Furthermore, it is submitted that the distinctions are such that a person having ordinary skill in the art at the time the invention was made would not have been motivated to modify Kim, Saito et al. or JP '909 in such a manner as to result in, or otherwise render obvious, the present invention as recited in claims 12 and 17. Therefore, it is submitted that claims 12 and 17, as well as claims 13-16 and 18-20 which depend therefrom, are clearly allowable over the prior art of record.

In view of the foregoing amendments and remarks, it is respectfully submitted that the present application is clearly in condition for allowance. An early notice thereof is respectfully solicited.

If, after reviewing this Amendment, the Examiner feels there are any issues which must be resolved before the application can be passed to issue, the Examiner is respectfully requested to contact the undersigned by telephone in order to resolve such issues.

Respectfully submitted,

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March 8, 2004